REMARKS

Claim 12 has been amended. No new matter has been introduced. Claims 12-15 remain pending in this application.

Claims 12-15 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. This rejection is respectfully traversed.

Applicant respectfully submits that the application enables a person skilled in the art to carry out the subject matter of the claimed invention. The Examiner asserts that the original application does not support the limitation "the concentration of dimethyl ether is between 30 and 68% w/w, and the concentration of water is between about 14 and 40% w/w," as recited in claim 12. The original claims, however, recite that the feed stream to the catalytic dehydration is methanol with up to 20 wt% water or ethanol or higher alcohols, and that the conversion of this methanol in the hydration process is 50 to 95%. The reaction scheme for the conversion in the dehydration is disclosed at page 6, line 7 of the original application. Thus, a person skilled in the art is able to unequivocally derive the above concentrations of dimethyl ether ("DME") and water.

For example, using 100 grams of methanol at a 50% conversion yields about 35.9375 grams DME, which corresponds to 35.9375 wt%, and about 14.0825 grams of water, which corresponds to 14.0825 wt%. At a 95% conversion of methanol, the concentration values are about 68.28125 grams DME, corresponding to 68.28125 wt%, and about 28.71875 grams of water, corresponding to 28.71875 wt%. Similarly, using 100 grams of methanol and 25 grams of water, at a 50% conversion, yields about 35.9375 grams DME, which corresponds to 28.76 wt%, and about 39.0625 grams of water, which corresponds to 31.25 wt%. At a 95% conversion, the hydration process

yields 68.28125 grams DME, corresponding to 54.625 wt%, and 51.71875 grams of water, corresponding to 41.375 wt%.

Accordingly, because the specification enables a person skilled in the art to carry out the invention recited in claimed invention, Applicant respectfully requests that the rejection under 35 U.S.C. §§ 112, second paragraph, be withdrawn.

Claims 12-15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Basu et al., U.S. Patent No. 6,270,541 ("Basu") in view of Applicant's admitted prior art. This rejection is respectfully traversed.

Applicant respectfully submits that the cited prior art, considered alone or in combination, fail to disclose, teach or suggest all limitations of claims 12-15. Basu discloses a fuel composition which is different from that used according to the claimed invention. The fuel composition of Basu comprises from 70 to 95 wt% dimethyl ether, up to 20 wt% methanol and from 0.1 to 20 wt% water. (Abstract). On the other hand, the fuel used in the present invention comprises from 30 to 68 wt% dimethyl ether, from 5 to 50 wt% methanol and from 14 to 40 wt% water.

Fuels with different compositions and different concentrations do not possess the same ignition and combustion characteristics. This is well demonstrated by the test results set forth in the description of the present invention in Tables 3 to 8 and summarized in Table 9. For example, pure DME at 124°C and DME with 4 wt% methanol and 48 wt% water at 125°C combust differently:

Fuel consumption is 21.80 MJ/H and 24.49 MJ/H, respectively,

Exhaust gas contains 259 ppm NO_x and 7ppm NO_x, respectively, and

64 ppm hydrocarbons and 239 ppm hydrocarbons, respectively.

In addition, Basu discloses the influence of fuel composition on emission. (Col. 5, lines 15-33). Consequently, a person skilled in the art would not expect fuels of different compositions to have the same properties.

The Examiner concedes that Basu "differs from the claims in that he does not specifically teach that dimethyl ether is present in an amount of 30-68% w/w." Instead, Basu teaches a range of 70 to 95% w/w ether is present. The Examiner relies on Titanium Metals Corp. of America v. Banner, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985) to argue that the claimed range and prior art range are close enough that one skilled in the art would "expect" the same properties. Applicant respectfully submits that this argument is insufficient to support a § 103 rejection. The Examiner must rely on case law *only* if the facts in the prior decision are *sufficiently similar* to those in the application. MPEP 2144; In re Eli Lilly & Co., 902 F.2d 943, 14 USPQ2d 1741 (Fed. Cir. 1990) (stating that all relevant facts must be considered when applying case law to an application rejection). In Titanium, two alloys in the prior art cited by the Examiner had similar compositions to the claimed invention. The claimed invention's composition was 0.3% Mo and 0.8% Ni. The two alloys in the prior art had 0.25% Mo-0.75% Ni and 0.31% Mo-0.94% Ni. The court held that the proportions were so close that one skilled in the art would expect them to have the same properties.

Applicant respectfully submits that the facts of Titanium differ from this present application. As the Examiner concedes, Basu discloses 70% w/w ether. The claimed invention teaches a range from 30 to 68% w/w ether. This is not similar to the facts in Titanium. The 2 % difference between the w/w ether of Basu and the upper limit of the range of the claimed invention is significant. In contrast, the proportions in Titanium differ by less than a tenth of a percent. Accordingly, the rationale of Titanium can not support an obviousness rejection in this present case.

The Examiner also concedes that Basu fails to teach that "the air for combustion is preheated to a temperature of at least 60°C." (Office Action at 3). The disclosure of an exhaust gas recirculation system of Basu and the disclosure of an exhaust gas temperature from 200 to 500°C in present invention do not suggest the purpose of heat content in the exhaust gas. Additionally, merely mentioning the use of an exhaust gas recirculation system does not suggest using the heat of the exhaust gas to preheat the combustion air. Basu's exhaust gas recirculation system does not describe how much of the exhaust gas is recirculated nor does Basu disclose the temperature of the exhaust gas. Thus, there is no way to determine the temperature of incoming air in Basu to "at least 60°C," as recited by claimed invention.

Further, Basu uses a diesel engine equipped with an air-to-air intercooler, such that the combustion air is cooled by ambient air *before* it is introduced to the combustion chamber of the engine. Consequently, the description of the engine in Basu does not disclose, teach or suggest to heat combustion air before it is introduced to the combustion chamber. Basu is also completely silent about heating combustion air with exhaust gas.

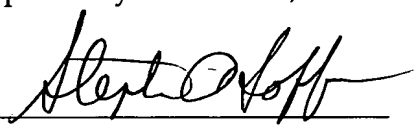
The Examiner also states that Applicant test results are not unexpected and that Applicant has not compared the present invention to the closest prior art of record. (Office Action at 4). Applicant respectfully submits that the closest prior art of record does not disclose test results which can be compared with the test results of the present application. However, in the description of the present application, the test results of the claimed fuel are compared with the test results of other similar fuels. In Table 9, operations of an engine with diesel fuel, with DME fuel, and with fuel of the present invention are compared. The advantage of preheated combustion air and of the claimed fuel is shown from the lower fuel consumption and from the lower NO_x, HC, and CO contents of the exhaust gas. The prior art discloses the use of fuel with a 70 to

95% DME in an engine with cooling of incoming combustion air. This does not suggest to on board convert methanol to 30 to 68% DME (and 5 to 50% methanol and 14 to 40% water) and to combust this fuel with pre-heated combustion air at 60°C, preferably 100°C. The test results prove that better performance of a diesel engine is obtained by the presently claimed process. Consequently, the claimed process is submitted to be new and non-obvious.

For all of the above reasons, withdrawal of the rejection of claims 12-15 is respectfully requested.

Dated: June 29, 2006

Respectfully submitted,

By 

Stephen A. Soffen
Registration No.: 31,063
DICKSTEIN SHAPIRO MORIN & OSHINSKY LLP
2101 L Street NW
Washington, DC 20037-1526
(202) 785-9700
Attorney for Applicant